302 KAR 16:080. Qualifications and inspection criteria for bungee jumping or similar apparatus permit.

RELATES TO: KRS 247.232, 247.234
STATUTORY AUTHORITY: KRS 247.232, 247.234, 247.236
NECESSITY, FUNCTION, AND CONFORMITY: KRS 247.234 requires the Department of Agriculture to establish the criteria for obtaining a permit to operate an amusement ride or attraction in the Commonwealth of Kentucky. This administrative regulation establishes requirements for designated bungee jumping or similar apparatus.

Section 1. Definitions. (1) "Air bag" means a device which cradles the body and which uses an air release breather system to dissipate the energy due to a fall, thereby allowing the person to land without an abrupt stop.

(2) "Bungee cord" means the elastic rope to which the jumper is attached.

(3) "Bungee jumping" means a person falling from a height, including either a permanent or mobile jumping facility, where the descent is limited by attachment to the bungee cord.

(4) "Bungee jump site" means the area designated for the bungee jump operation by the owner or operator and approved by the Kentucky Department of Agriculture.

(5) "Carabineer" means a shaped metal device with a gate used to connect sections of the bungee cord, jump rigging, equipment or safety gear.

(6) "Catapulting, launching, negative or reverse jumping" means the practice of stretching the bungee cord while attached to the jumper who is held on the ground then released and propelled into the air.

(7) "Dynamic loading" means the load placed on the bungee cord, rigging, harness, etc. by the weight of the jumper plush and the G forces involved.

(8) "G force" means the unit of force equal to the gravity exerted on a body at rest.

(9) "Harness" means an assembly to be worn by a jumper and to be attached to a bungee cord designed to prevent the wearer from becoming detached from the bungee system.

(10) "Lift" means a device or similar equipment utilized to transport customers, the general public, or employees to work area or jump launch area.

(11) "Military specification (Mil-Spec) cord" means:

(a) Preloaded or prestretched rubber cords that are:

1. Originally developed for military use;

2. Made in conformance with military specifications and are often referred to as "Mil-Spec"; and

3. Usually cotton or nylon sheathed; or

(b) Nonmilitary sheathed cords usually made of three (3) to five (5) sheathed cords contained in one (1) outer sheathing.

(12) "New Zealand cord" means all rubber cords that:

(a) Are made of synthetic or natural rubber using continuous loops or strands;

(b) Were developed in New Zealand;

(c) Do not usually utilize any sheathing; and

(d) Are configured as one (1) large cord made of several hundred small rubber strands.

(13) "Platform" means the launch area where jumpers will be assembled and depart from.

(14) "Safe working load (SWL)" means the maximum rated load which can be safely handled by equipment or a component of the rigging under specified conditions, expressed in pounds.

(15) "Safety factor" means the ratio obtained by dividing the breaking load of any piece of equipment by its working load.

(16) "Safety harness (safety belt)" means an assembly worn by a jump master, etc. designed to be attached to a safety line to stop the wearer from falling.

(17) "Safety line" means a line used to connect the safety harness or belt to an anchorage point or rail in situations where there is a risk of a fall.

(18) "Sandbagging" means the practice of a jumper holding onto any object (including another person) while jumping, for the purpose of exerting more force on the bungee cord in order to stretch it further, and then releasing the object at the bottom of the jump causing the jumper to rebound with more force than could be created by the jumper's weight alone.

(19) "Stunt jumping" means the combining of any other activity with bungee jumping with disregard for safety clearances as outlined in this criteria.

(20) "Tandem, multiple, or double jumping" means the practice of two (2) or more harnessed together while jumping simultaneously from the same platform.

(21) "Ultimate tensile strength" means the point at which the applied load reaches a maximum prior to failure, expressed in pounds.

Section 2. Applicability and Inspection Criteria. (1) Applicability.

(a) This administrative regulation shall apply to bungee jumping sites and operations open to the general public.

(b) This administrative regulation shall not apply to bungee jumping sites and operations the department determines are for demonstration or exhibition purposes only and which are not open to the general public.

(2) Inspection criteria. This administrative regulation provides inspection criteria for:

(a) Site and site approval;

(b) Design;

(c) Equipment testing;

(d) Management operation;

(e) Operation procedures;

(f) Emergency provisions; and

(g) Emergency procedures.

Section 3. Operating Approval. (1) The owner or operator of a bungee jumping site or facility shall be issued a permit from the Kentucky Department of Agriculture pursuant to KRS 247.234 and this administrative regulation prior to operation in the state of Kentucky.

(2) The owner or operator of a bungee jumping site or facility shall comply with 247.232 to 247.236 and 302 KAR Chapter 16 all relevant statutes and administrative regulations throughout the permit period.

(3) The following business identification number periods and inspection fee shall apply to all bungee jumping sites or facilities operating in the Commonwealth of Kentucky.

(a) For permanent and mobile installations the business identification number shall be renewed annually.

(b) For mobile operations an inspection fee will be charged at each "set-up".

(4) Site plan and equipment design and construction.

(a) A report shall be submitted to the construction or "set-up" which shall contain site plans, safety zones, drawings, specifications and certification of equipment and structures, and operating manuals.

(b) The department may require a registered engineer's report that the design and construction of the structures, equipment, access ways, operating areas, and intended method of operations meet applicable engineering standards and local codes.

(c) The owner or operator of a bungee jumping site or facility shall provide a certificate of insurance to the department that an insurance policy exists covering any spectator or patron in the amount required by law.

Section 4. Permanent Platform. All bungee jumping sites or facilities shall be equipped with a platform which meets the following criteria:

(1) The safety working load (SWL) shall be determined by the maximum weight on the platform at any one (1) time, with a safety factor of not less than five (5), to include any dynamic loads from the jumping operation.

(2) If the platform is not an integral part of the structure to which the platform is attached, the SWL shall have a safety factor of at least five (5) over the total design load, to include any dynamic loads from the jumping operation.

(3) If the platform is not an integral part of the structure, the platform shall have a back-up safety at all times with a safety factor of at least five (5).

(4) On either type of platform, a balance load shall be maintained during all operations.

(5) The platform shall have a slip-resistant floor surface. The platform shall be constructed of an open mesh type steel to insure jump master has visual site of jumper at all times during the jump operation from jump until recovery.

(6) The platform shall have anchor points for safety harness belt lanyards, designed and placed to best suit the operator's need.

(7) The platform shall be constructed to have sufficient working space, for the intended number of persons, as specified in the site manual.

(8) There shall be a self-closing gate with an automatic positive lock system across the jump point when a jumper is not present at the jump point.

(9) Access and platform walkways, stairways, ladders, handrails, etc. shall meet minimum OSHA standards, 29 U.S.C. 651 and 29 C.F.R. 1900 to 2000, and Kentucky Building Code, KRS Chapter 198B, if applicable.

(10) All shackles shall be safety-wired.

(11) The system for recovering the jumper shall be operated by either the jump operator or jump master.

(12) There shall be an alternative method of jumper recovery should the main recovery system fail to recover the jumper.

(13) In a human powered retrieval system or in a friction lowering system, an eleven (11) mm or larger rock climbing rope shall be used.

(14) If, in a human powered retrieval system, a jumper is pulled back up to the jump platform, a locking mechanism (for example, and ascender or jumper) shall be used to stop and hold the jumper in one (1) place once the applied force on the retrieval rope is removed.

(15) In a friction lowering system there shall be a "dead man switch" or locking mechanism that will stop the lowering action of the system should a situation arise in which the person in charge of lowering the jumper becomes unconscious or unable to perform the lowering duties safely.

(16) All bungee cords shall be attached to the anchor point at all times the cord is in the connection area.

Section 5. Bungee Cord(s). All bungee cords used at bungee jumping sites or facilities shall meet the following criteria:

(1) The minimum factor of safety (FS) for any configuration bungee cord shall be not less than five (5). The maximum dynamic load possible for a jumper to exert on a bungee cord shall be no greater than one-fifth (1/5) or twenty (20) percent of that cord's minimum breaking

strength. Minimum breaking strength shall be no less than that recommended by the manufacturer.

(2) The maximum G force allowable to a jumper using waist and chest harness is four and five-tenths (4.5) Gs. The maximum G force allowable to a jumper using an ankle harness is three and five-tenths (3.5) Gs.

(3) In a multiple cord design (Mil-Spec) the cords shall be entirely enclosed in a protective sheath.

(4) In a single cord system the binding shall hold the cord threads in the designed positions. The binding shall have the same characteristics as the cords itself.

(5) Bungee cord design, manufacturing, and testing shall meet the following specifications:

(a) All bungee cord manufacturers shall perform conclusive ultimate tensile strength testing on a representative amount of all manufactured bungee cords with stress to failure of the bungee samples. The bungee cord sample shall have been constructed using the manufacturer's standard methods which shall include bungee cord end connections. All tests shall be performed or supervised by an independent testing laboratory or a certified engineer. Test results shall be readily available, upon request. The ultimate tensile strength is reached when the applied load reaches a maximum before failure.

(b) A load verses elongation curve, resulting from the aforementioned test shall be used to calculate the maximum G force exerted by the cord on a jumper within the proper weight range. Documentation of these calculations shall be readily available upon request.

(c) All bungee cord manufacturers shall provide specifications on maximum allowable usage of bungee cords expressed in number of jumps.

(d) All bungee cord manufacturers shall provide specifications on maximum deterioration or damage to cords allowed. This may include but is not limited to hours of ultraviolet light exposure, percentage of broken threads, evidence of thread wear, etc.

(6) Bungee cords shall be removed from use and destroyed if:

(a) They exhibit deterioration or damage;

(b) They do not react according to specifications;

(c) They have reached the maximum usage expressed in number of jumps as specified by the manufacturer;

(d) They exhibit any abnormalities as specified by the manufacturer.

(7) Bungee cords shall be considered destroyed if they are cut into lengths not greater than five (5) feet.

(8) All operators shall have an audible system for recording the number of jumps on each individual cord in use. This data shall be readily available to the manufacturer, any jumper, and any regulating authority. This recording system shall be documented in the site manual:

(a) Cord manufacturer;

(b) Cord lot;

(c) Cord serial number;

(d) Total allowable jump per manufacturer specifications;

(e) Record name of jumper to include address and phone number;

(f) Jump date and time.

(9) Any material such as "webbing" used in either of the two (2) end attachment points of a bungee cord regardless of whether it is designed as a single or multiple cord system shall have a strength of at least three (3) times the ultimate tensile of the cord.

(10) All end attachment points subject to wear are to be retired and destroyed when that cord is retired and destroyed.

(11) The unloaded length of the bungee cord plus the rigging system shall be less than one-half (1/2) the designed extended length.

Section 6. Jumper Harness and Hardware. All bungee jumping harnesses and hardware shall meet the following criteria:

(1) All harness, webbing, bindings, ropes, and hardware shall meet or exceed the standards as set by the National Fire Prevention Association (NFPA) 1983 Standard on Fire Service Life Safety Rope, Harness, and Hardware (1990 Edition).

(2) A jumper harness shall be either a full body harness, a sit harness with shoulder straps, or an ankle harness. Harnesses shall be specifically designed and manufactured for mountaineering or bungee jumping.

(3) Harnesses shall be available to fit the range of patron sizes accepted for jumping.

(4) There shall be a redundant connection (back-up) between the harnesses and the cord(s).

(5) All load supporting slings or webbing shall be flat tubular mountaineering webbing or its equivalent. Minimum breaking strength shall be 6,000 pounds. Slings or webbing shall be formed by sewing, or properly tied with a "water knot" with taped ends.

(6) Carabineers shall be the steel crew gate type with a minimum breaking strength of 6,000 pounds. All carabineers shall be designed and constructed using the standards for mountaineering gear. Carabineers used for life-supporting activities shall be of the locking design.

(7) All ropes, pulleys, and shackles used to raise, lower, or hold the jumper shall have a minimum breaking strength of 6,000 pounds. All pulleys shall be compatible with the rope.

(8) All anchors shall meet or exceed the following:

(a) If a single anchor is used to attach the bungee cord to the platform, it shall have a factor of safety of twenty (20).

(b) If two (2) anchors are used to attach the bungee cord to the platform, each shall have a safety factor of five (5).

(c) If the anchor(s) is made of wire rope, it shall have swagged ends with the thimble eyes.

(d) If the anchor is made of "webbing", it shall be manufactured by a company that normally supplies these anchors to crane and rigging companies.

(9) Test of all jumper harnesses and hardware shall be available to the inspector.

(10) All items shall be serial numbered.

Section 7. Equipment Inspection and Testing. All bungee jumping sites or facilities shall comply with the following equipment inspection and testing criteria:

(1) All bungee cords shall be inspected by the jump master. Frequency of inspection shall be stated in the operations manual. At a minimum, the cords shall be inspected prior to opening the site each day, and any other inspections specified by the bungee cord manufacturer shall be conducted.

(2) All jump rigging lowering system, platform, anchors, and safety gear shall be regularly inspected for damage or wear, by the jump master. Frequency of inspection shall be stated in the operations manual. At a minimum, the equipment shall be inspected prior to opening the site each day, and any other inspections specified by the equipment manufacturers shall be conducted.

(3) All harnesses and harness rigging shall be inspected for damage or wear before use by each jumper.

(4) Hardware subject to abnormal loadings, being impacted against hard surfaces, or having surface damage, shall be replaced.

(5) Ropes, webbing, and slings subject to abnormal shock load shall be replaced.

(6) Any items of equipment, rigging, or safety gear that are found to be substandard shall be replaced immediately. If a replacement is not available, jumping shall cease immediately, until a proper replacement is available.

(7) Each item shall have its own permanent individual identification.

(a) The application of this identification shall not harm the material of the item.

(b) The identification shall be clearly visible to the operators during daily operations.

(c) The identification shall be recorded on the equipment log sheet.

(d) Recovery time between reusage on each bungee cord after each use will be marked on cord and/or entered in log book by serial number.

Section 8. Jump Area or Jump Space. The following criteria regarding the jump space or jump area shall apply to all bungee jumping sites or facilities:

(1) Jump area.

(a) The jump space shall be defined using dimensions in the lateral (perpendicular), and longitudinal (parallel) directions with respect to the jumper's direction of launch. The following criteria shall be used to design this space:

1. Maximum system length - the maximum stretched length of a bungee cord system including static line length.

2. Average cord length - the average of the unstretched (static) bungee cord system length and the maximum system length.

(b) The jump space shall be defined in two (2) parts: top jump space and bottom jump space. The top jump space shall be directly above the bottom jump space. The jump space shall be longitudinally and laterally centered under the jump point.

(c) The bottom jump space shall be a box-shaped volume extending from ground level upward to an altitude lying below the jump point by a distance equivalent to fifty (50) percent of the maximum system length. The longitudinal dimension of this volume (length) shall be equivalent to 200 percent of the unstretched, static length of the bungee cord system.

(d) The top jump space shall be a pyramid-shaped volume. The four (4) base points of this pyramid shape shall be coincident with the topmost four (4) points of the bottom jump space. The top point of this pyramid shape shall be coincident with the jump point. (See Annex 1)

(e) The jump space shall be free of obstructions with the exceptions of the water or air bag.

(2) Over land.

(a) The jump area shall be fenced or other barriers provided. The fence or barriers shall be designed to prevent people and animals from entering the jump area.

(b) The jump area shall be free of spectators at all times.

(c) The jump area shall be free of any equipment or staff if a jumper is being prepared on the jump platform and until the jumper is stable after the jump.

(d) If the jumper is lowered for recover, a clean, smooth, nonabrasive surface shall be provided for the jumper and cord(s). This recovery area shall be at least ten (10) feet by ten (10) feet.

(e) A place for the jumper to sit and recover shall be provided close to, but outside the landing area.

(f) An air bag certified for a fall from the platform height shall be in place centered under the jumper.

(g) There shall be adequate clearance between the jumper at full extension and the surface of the air bag.

(h) Adequate storage shall be provided on site to protect equipment from damage. The storage shall be secured against unauthorized entry.

(3) Over water.

(a) The jump space/landing area shall be free of other vessels, floating and submerged objects and the public, and if in open water, shall be defined by the deployment of buoys. A sign of appropriate size which reads "BUNGEE JUMPING KEEP CLEAR" shall be fixed to the four (4) sides of the buoy line.

(b) Minimum water depth shall be nine (9) feet.

(c) The recovery vessel shall:

1. Be properly registered and/or certified by appropriate authorities.

2. Be positioned accurately and remain in a constant position for the recovery.

3. Have a landing pad size of at least five (5) feet by five (5) feet, within and lower than the sides of the vessel.

4. Be able to be maneuvered in the range of water conditions expected and shall enable staff to pick up a jumper or other person who has fallen into the water.

5. Have a minimum of two (2) operators: one (1) to pilot the vessel and at least one (1) other to assist jumper recovery. At least one (1) jumper recovery assistant shall be a certified life guard.

(d) If the landing area is part of a constructed swimming pool complex or is specially constructed for bungee jumping the following shall apply:

1. The pool size shall meet the requirements for the jump area size.

2. The minimum water depth shall be nine (9) feet.

3. Rescue equipment shall be available.

4. The jump space and landing area shall be fenced.

5. Only the operators and participants of the bungee jump shall be within the jump space and landing area.

Section 9. Site Manual. (1) Each site shall have an operating manual, referred to as the site manual, for the safe operation of the site. A copy of the manual and any amendments shall be held at each site, and shall be freely available to the staff. At a minimum, the manual shall include:

(a) A site plan view of the site with all components in place, fencing, and the jump zone defined.

(b) Job descriptions or position duties and responsibilities.

(c) Personnel qualifications - required and actual.

(d) Staff training procedures and documentation.

(e) Inspection/maintenance procedures - to include inspection frequency, inspection standards, follow-up actions.

(f) Equipment descriptions/certifications/test documentation.

(g) Disaster/emergency plans procedures.

(h) Accident/incident reporting procedures.

(i) Examples of forms to be used.

(j) Examples of logs to be kept.

(k) Daily preopening inspection/maintenance procedures.

(l) Jumper restrictions - age, weight, medical, physical and mental condition.

(m) No jumper below the age of eighteen (18).

(n) No signed certificate allowed for permission for under the age of eighteen (18).

(o) Jumper interview and acceptance procedures.

(p) Jumper preparation procedures.

(q) Jump procedures.

(r) Recovery procedures.

(s) Close-down procedures.

(t) State maximum weather conditions for safe operation.

(2) Any amendments to the site manual shall be approved in writing by the Kentucky Department of Agriculture, Amusement Rides and Attractions Inspection Section before implementation.

Section 10. Operations. (1) There shall be an operating public address system on site.

(2) There shall be a telephone communication link to emergency medical and rescue services within a reasonable distance.

(3) A sign shall be posted listing the medical, weight, and age restrictions for jumpers. The sign shall be clearly visible to intending jumpers. Letters shall not be less than one-half (1/2) inch.

(4) Symbols shall not be less than three and one-half (3 1/2) inches across at any point required for persons not able to read the English language.

(5) Owners and operators shall comply with KRS 247.236, Operation and Construction of Amusement Rides and Attractions, and 302 KAR Chapter 16.

(a) Jumper jump area shall be secured (enclosed with a mesh type fence constructed of steel, not less than five (5) feet four (4) inches in height with no opening less than two (2) inches except at gate hinge points and at locking catch and these areas only large enough for operation. Landing zone operator shall clear the area during jump. Assign position or position shall be marked for operator during jump.

(b) Floor shall be constructed of steel if no solid material - material of steel to be mesh with no opening less than one (1) inch not greater than two and one-half (2 1/2) inch opening.

(c) The jumpers shall be instructed and prepared in a place separated from the jump point.

(d) Safety type ring to frame to connect to jumper while being prepared for jump at all times.

(e) Approved scales shall be used in weighing a jumper if fully prepared for jump (Kentucky Department of Agriculture, Division of Weights and Measures inspection of weighing device report must be posted.)

(f) Adjustments for the weight of each jumper shall be made by the jump masters selection of bungee cord(s) and adjustment of the length of the rigging.

(g) The jump master shall stop the jumping operations if the weather conditions affect the safe operation of the site.

1. Wind speed and direction indicator with readout shall be at jump platform.

2. Ceases operation instruction shall be posted at each site indicating limitation due to operation height and wind speeds or other factors due to weather.

(h) The mobile platform for jumping shall be a constant height above the ground or surface.

(i) All staff members shall be easily identifiable from the public or jumpers, by means of uniforms or similar clothing colors, etc.

(j) All operations and passengers on mobile platforms shall wear a safety belt or harness and lanyard attached to the anchor points, at all times the platform is elevated.

(k) The jumper, on a mobile platform shall wear a safety lanyard attached to the anchor points until jump height is reached.

(l) Bungee "catapulting", "negative jumping", "reverse jumping" or "launching" shall be prohibited.

(m) "Tandem", "double" or "multiple" jumping shall be prohibited.

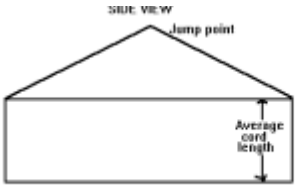
(n) "Sandbagging" shall be prohibited.

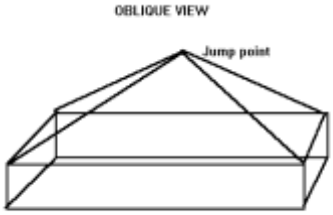
Section 11. Unacceptable Operation Activities. The following equipment shall not be used at any bungee jumping site or facility in the Commonwealth of Kentucky:

(1) Mobile or fixed type cranes not designed, manufactured, tested, nor intended to primarily handle personnel.

(2) Lighter than air type aircraft or aircraft not regulated by the Federal Aviation Administration such as hot air balloon, blimp, helicopter or other craft that are not regulated by Federal Aviation Administration.

Section 12. Jump Space Diagram.





Average cord length =

$$\frac{\text{stretched length} + \text{relaxed length}}{2}$$

Cord length = length of bungee cord + length of any rigging from jumper harness to anchor point.

Section 13. Incorporation by Reference. (1) The following material is incorporated by reference:

(a) "The National Fire Prevention Association (NFPA) 1983 Standard on Fire Service Life Safety Rope, Harness and Hardware", 1990 Edition; and

(b) "Safety Air Cushion Standards", 1992.

(2) This material may be inspected, copied, or obtained, subject to copyright law, at the offices of the Division of Weights and Measures, Kentucky Department of Agriculture, Frankfort, Kentucky 40601, Monday through Friday, 8 a.m. to 4:30 p.m. (18 Ky.R. 3271; Am. 19 Ky.R. 712; eff. 8-27-92; 35 Ky.R. 2137; 2423; eff. 6-5-2009.)